Cement MILL SECTION of

Concrete

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Synchronous Motor Drives with Built-in Clutches

Unique Method Used in Modernizing Tube Mill Drive Conserves Space

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At the beginning of the year 1925, rather extensive changes were made in the raw and finished fine grinding departments of the Louisville Cement Co., involving the discontinuance of a Corliss engine and motorization of five No. 18, F. L. Smidth tube mills. On these new drives Westinghouse synchronous motors with built-in magnetic clutches were used, rated 300 HP. at 150 rpm. for direct coupling to the tube mill pinion shafts.

This type of motor is a combination of a synchronous motor and a standard magnetic clutch. The driven or flexible half of the clutch is keyed to the motor shaft, while the driving or rigid half is mounted on the rotor spider. The complete rotor, with the driving half of the clutch, is mounted on the shaft by means of roller bearings, permitting free rotation of this member so long as the clutch halves are not engaged. With the rotor at synchronous

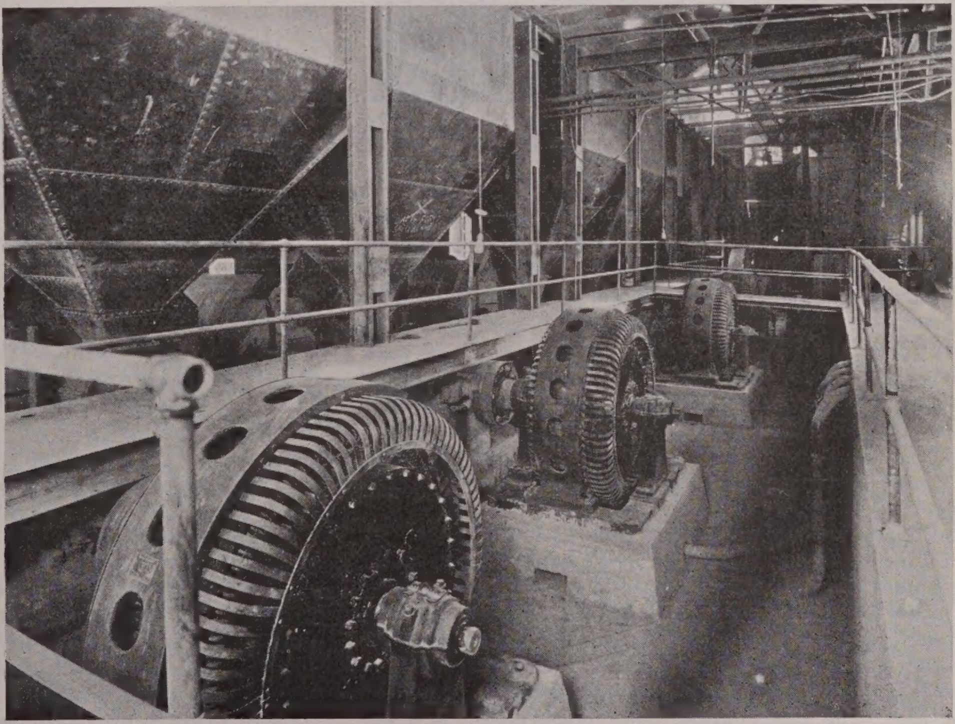


Fig. 1—Four Westinghouse synchronous motors with built-in-magnetic clutches driving finish tube mills

speed when the two halves of the clutch are brought into contact the friction developed caused the driven half to be brought up to speed and with it the shaft and the load. The magnetic principle is used to bring the two clutch halves into contact. A coil is located in the rigid or rotor half of the clutch which is excited by direct current from the same source which supplies the motor field. This coil sets up a magnetic attraction for the rim of the flexible half of the clutch causing the disc to warp slightly from a plane to a slightly conical surface, bringing the broad interior surface of this rim against a woven asbestos friction lining on the rotor half, thereby developing the frictional force for acceleration.

Satisfaction with this equipment dates from the time of receipt of the motors on the plant siding. Being shipped as units completely assembled on their own bedplates, to install them it was simply necessary to place them upon their foundations, shim under the bedplates till the two halves of the flexible couplings through which they drive were in line and the bedplates level and then grout them in. There was no worry about motor air gaps, nor clutch alignment, as these features were taken care of permanently in the manufacture of the motors.

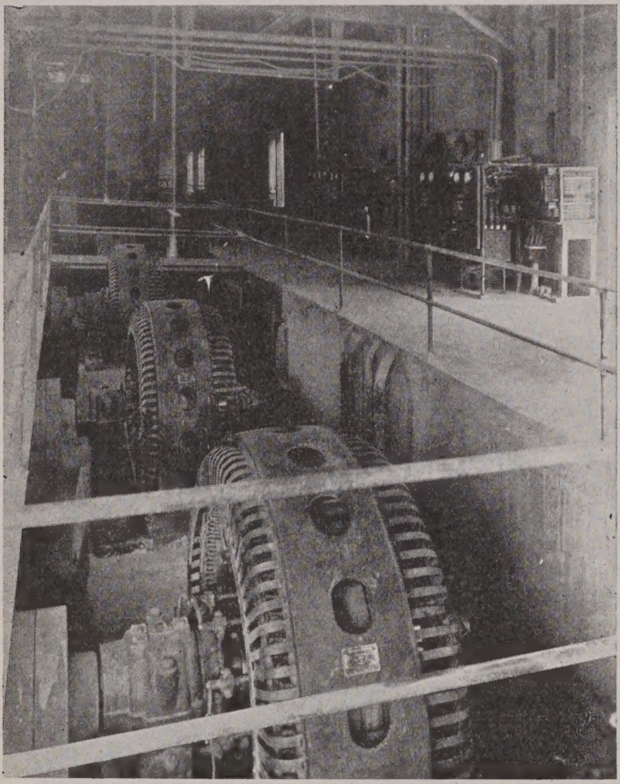


Fig. 2. Manually operated control panels for the finish mill motors.

There is a striking comparison between the neat compact arrangement of these motors and the maze of swift flapping belting that goes with the old steam engine drive, a comparison which is expected to show up in reduced maintenance and in the indefinite but very actual element of safety.

The operation of one of these units is the same as with the familiar standard coupled type synchronous motor with separately mounted magnetic clutch. In bringing up the mills the motor has available any torque up to its pullout torque. Continuous operation of the motor rotor with the load disconnected permits utilization of the machine as a condenser at such times as the mill is required to be idle. The free running rotor construction is a distinct advantage under this condition, as it results in practically complete enclosure of all moving parts within the stationary frame of the motor. As the frame is always stationary, the main motor current is handled through fixed leads, the only slip rings in the construction being three of the usual type of rotor rings handling the field and clutch currents, both of which are of low intensity.

Dust-proof bearings are a feature which are proving particularly commendable. Examination of the oil in one of the pedestal bearings after two months service revealed no dirt whatever and with this indication of effective dust protection, unusual bearing service is anticipated.

The controllers for these motors are of the manual reduced voltage starting type, with additional features incident to the control of the clutches. The clutch current is easily adjusted by means of a rheostat, and the clutch circuit is so interlocked with the motor armature and field circuits that it is impossible for the operator to engage the clutch until the motor is running on full voltage and with excitation. If it is desired to stop the mill, allowing the rotor of the motor to run idle, this is done by simply operating a push button which results in opening the clutch circuit. The energy required for excitation of the clutch is slight, being about 3/8 KW. or about 1/6 of 1% of the rated output of the motor.

From the standpoint of compactness, simplicity, convenience and safety we have found this type of drive excellently suited to tube mill service.

Universal Breaks Safety Record

All safety records during its quarter of a century's history were broken last year by the Universal Portland Cement Co., according to the statement of B. F. Affleck, president of the company, made public in January.

"While production greatly increased during the last 25 years, the accident rate has steadily declined until last year it was only a fraction of 1% in relation to the total number of persons employed," he reported. "In our plant at Duluth, for example, the whole year passed without having an hour's time lost on account of accidents. Our plants in other cities produced similarly good results.

"During the month of December just finished a 100% safety record was achieved at all our plants, no time being lost anywhere because of accidents. The significance of this record is revealed when one recalls that thousands of men are employed day and night operating burning, crushing and grinding machinery, elevators, conveyors, cranes, packing machines and electrical apparatus required in making some 60 million sacks of cement in a year."

Two factors were named by Mr. Affleck as being chiefly responsible for the results secured.

"Modern mechanical safeguards to protect workers in hazardous circumstances are installed wherever needed," he said. "This naturally tends to reduce risks to employes who may be careless.

"But no machine can be 100% guarded. There always must exist personal responsibility on the part of the worker. We find therefore that the most effective means to secure safety is to talk safety, to teach it, and to educate employes always to think of it. Hence there are safety meetings conducted in various languages; there is literature distributed that features safety; there are printed placards urging workers to be careful; there are prizes for mills and groups who make the best records. Through these means there is developed individual caution and a sense of pride in preventing accidents that have done much to make industry safe."

Portland Cement Output in 1925 Exceeds 161 Million Barrels

Summary of Estimates of Output in 1925, by Districts, Show Increases Over 1924.

December production of portland cement shows an increase of over 3% and shipments an increase of more than 25%, as compared with December a year ago, according to the Bureau of Mines, Department of Commerce. Stocks of portland cement are over 30% greater than at the end of 1924, and the preliminary totals for 1925 show increases of 8% in production and more than 7% in shipments over the final totals for 1924. The following tables prepared by the Division of Mineral Resources and Statistics of the Bureau of Mines are compiled from reports for December, 1925, received direct from all manufacturing plants except two, for which estimates were necessary on account of lack of returns.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1924 AND 1925, IN THOUSANDS OF BARRELS

	Production		Shipments		Stocks at end of month	
Month	1924	1925	1924	1925	1924	1925
January	8,788	8,856	5,210	5,162	14,155	17,656
February	8,588	8,255	5,933	6,015	16,815	19,689
March	10,370	11,034	8,995	10,279	18,189	20,469
First Quarter	27,746	28,145	20,138	21,456	—	—
April	11,726	13,807	12,771	14,394	17,159	19,877
May	13,777	15,503	14,551	16,735	16,403	18,440
June	13,538	15,387	15,036	17,501	14,903	16,409
Second Quarter	39,041	44,697	42,358	48,630	—	—
July	14,029	15,641	16,614	18,131	12,319	13,896
August	15,128	16,419	16,855	18,383	10,666	11,952
September	14,519	15,939	16,827	17,711	8,404	10,247
Third Quarter	43,676	47,999	50,296	54,225	—	—
October	14,820	15,992	17,160	15,309	6,073	10,979
November	13,141	*13,656	10,289	*10,187	8,928	*14,534
December	10,435	10,809	5,506	6,914	*14,123	18,429
Fourth Quarter	38,396	40,457	32,955	32,410	—	—
Preliminary Total	148,859	161,298	145,747	156,721	—	—
Amount of Underestimate	499	—	301	—	—	—
Final Total	149,358	—	146,048	—	—	—

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN DECEMBER, 1924 AND 1925, AND STOCKS IN NOVEMBER, 1925, IN THOUSANDS OF BARRELS

Commercial District	Production December		Shipments December		Stocks at end of December		Stocks at end of November,
	1924	1925	1924	1925	1924	1925	1925*
Eastern Pa., N. J., & Md.	2,883	3,053	1,606	1,908	2,545	2,498	1,353
New York	565	710	283	352	789	1,028	670
Ohio, Western Pa. & W. Va.	898	955	346	545	1,370	2,314	1,904
Michigan	491	904	182	309	1,051	1,913	1,318
Wis.,† Ill., Ind. & Ky.	1,519	1,295	527	629	2,051	3,548	2,882
Va., Tenn., Ala. & Ga.	947	942	792	813	494	851	722
Eastern Mo., Ia., Minn. & S. Dak.‡	953	817	263	357	2,744	2,882	2,422
Western Mo., Nebr., Kans. & Okla.	705	512	315	438	1,469	1,633	1,559
Texas	372	393	258	342	356	476	426
Colo. & Utah	138	33	63	77	316	306	349
California	879	971	774	1,016	503	484	529
Ore., Wash. & Mont.	85	224	97	128	435	496	400
	10,435	10,809	5,506	6,914	14,123	18,429	14,534

*Revised. †Began producing and shipping June, 1924. ‡Began producing December, 1924.

ESTIMATED CLINKER (UNGROUND CEMENT) AT THE MILLS AT END OF EACH MONTH, 1924 AND 1925, IN THOUSANDS OF BARRELS

Month	1924	1925	Month	1924	1925
January	5,458	7,017	July	6,646	6,961
February	6,905	8,497	August	5,367	5,640
March	8,271	9,962	September	4,260	4,561
April	8,545	9,731	October	3,548	4,086
May	8,225	9,053	November	4,025	*5,013
June	7,609	7,937	December	5,433	6,327

*Revised.

IMPORTS AND EXPORTS

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES, AND BY DISTRICTS, IN NOVEMBER, 1925

Imported from—	District into which imported—	Barrels	Value
Belgium	Florida	22,775	$31,885
	Massachusetts	28,590	41,179
	New Orleans	8,561	15,977
	Philadelphia	36,257	53,445
	Porto Rico	107	130
	San Francisco	10,932	14,774
	South Carolina	25,843	36,283
	Washington	19,237	36,990
	Total	152,302	$230,663
British West Indies	Florida	107	$275
Canada	Buffalo	1,793	$2,751
	Florida	62,482	103,817
	Saint Lawrence	74,808	122,689
	Vermont	608	860
	Total	139,691	$230,117
Denmark	Florida	5,957	$32,250
	Poro Rico	12,487	20,413
	Total	18,444	$52,663
France	New York	554	$936
Germany	New Orleans	3,431	$2,975
Japan	Hawaii	560	$723
Kwantung	San Francisco	30	$35
Norway	Florida	57,180	$132,680
	Massachusetts	14,625	24,133
	Total	71,805	$156,813
United Kingdom	New Orleans	1,644	$3,240
	Oregon	—	3
	Porto Rico	36	75
	Total	1.680	$3,318
Grand total		388,604	$678,518

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN NOVEMBER, 1925

Exported to—	Barrels	Value
Canada	1,165	$5,050
Central America	11,914	31,694
Cuba	40,801	97,440
Other West Indies	10,846	25,119
Mexico	8,445	25,147
South America	24,911	87,079
Other Countries	3,743	22,672
	101,825	$294,201

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1924 AND 1925

	Imports			
	1924		1925	
Month—	Barrels	Value	Barrels	Value
January	153,839	$250,799	229,838	$361,098
February	162,930	219,588	119,077	206,308
March	160,517	254,745	218,054	374,839
April	148,137	227,300	197,686	280,826
May	161,304	232,950	186,897	286,959
June	196,655	283,112	254,937	409,539
July	108,944	181,111	335,118	499,602
August	192,634	305,690	380,568	611,551
September	138,369	232,991	513,258	789,152
October	214,987	337,199	535,092	824,421
November	198,806	305,598	388,604	678,518
December	173,814	285,481	—	—
	2,010,936	$3,116,564	—	—

	Exports			
	1924		1925	
Month—	Barrels	Value	Barrels	Value
January	88,586	$252,497	71,596	$207,547
February	62,606	194,110	56,249	181,356
March	91,224	254,687	65,248	200,410
April	83,200	229,183	89,508	263,831
May	88,850	262,290	85,385	250,845
June	74,064	229,852	71,343	217,899
July	60,139	186,073	98,141	286,543
August	85,883	251,904	103,961	289,904
September	69,470	206,921	102,649	285,225
October	79,180	253,479	73,369	228,467
November	42,490	130,519	101,825	294,201
December	52,851	163,639	—	—
	878,543	$2,615,154	—	—

SUMMARY OF ESTIMATES OF STOCKS OF PORTLAND CEMENT AT END OF EACH MONTH IN 1925, BY DISTRICTS
(In thousands of barrels)
Stocks of finished cement

Commercial District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.*
Eastern Pa., N. J., & Md.	3,749	4,746	5,042	4,571	4,106	3,321	2,460	1,784	1,048	802	1,353	2,498
New York	1,167	1,233	1,272	1,232	1,164	985	757	623	465	411	670	1,028
Ohio, Western Pa., & W. Va.	1,788	1,977	2,017	2,017	1,966	1,735	1,612	1,517	1,232	1,515	1,904	2,314
Michigan	987	1,161	1,323	1,326	1,245	1,065	967	873	716	815	1,318	1,913
Wis., Ill., Ind., & Ky.	2,908	3,547	3,739	3,555	3,218	3,106	2,611	2,122	1,828	2,153	2,882	3,548
Va., Tenn., Ala., & Ga.	730	689	706	683	611	410	264	314	271	283	722	851
Eastern Mo., Ia., Minn., & S. Dak.	3,138	3,248	3,271	3,300	3,067	2,808	2,399	2,080	1,890	1,970	2,422	2,882
Western Mo., Neb., Kan., & Okla.	1,577	1,498	1,562	1,596	1,558	1,615	1,529	1,430	1,498	1,518	1,559	1,633
Texas	378	343	342	294	258	241	232	262	288	382	426	476
Colo., & Utah	341	372	306	312	350	343	382	362	366	398	349	306
California	525	468	514	520	473	451	435	391	451	458	529	484
Ore., Wash., & Mont.	368	407	375	471	424	329	248	194	194	274	400	496
	17,656	19,689	20,469	19,877	18,440	16,409	13,896	11,952	10,247	10,979	14,534	18,429

*Subject to revision.

SUMMARY OF ESTIMATES OF PRODUCTION AND SHIPMENTS OF FINISHED PORTLAND CEMENT IN 1925, BY DISTRICTS
(in thousands of barrels)

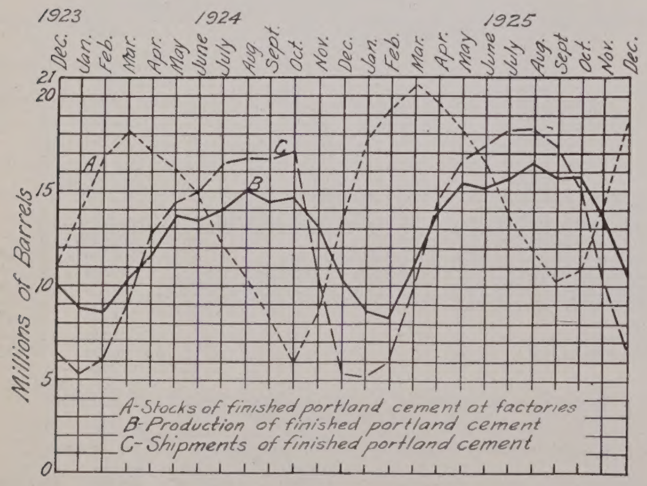
PRODUCTION

Commercial district—	Jan.*	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.*	Dec.	1925	1924
Eastern Pennsylvania, New Jersey and Maryland	2,267	2,486	3,054	3,337	3,660	3,554	3,703	3,726	3,685	3,851	3,457	3,053	39,833	38,657
New York	533	272	484	731	838	809	838	867	910	916	872	710	8,780	7,572
Ohio, Western Pennsylvania and West Virginia	764	593	816	1,275	1,540	1,587	1,618	1,810	1,620	1,700	1,241	955	15,519	14,331
Michigan	208	453	566	868	1,120	1,140	1,223	1,192	1,087	1,171	988	904	10,920	9,260
Wisconsin,† Illinois, Indiana and Kentucky	1,572	1,240	1,406	1,957	2,400	2,441	2,249	2,425	2,403	2,339	1,941	1,295	23,668	21,823
Virginia, Tennessee, Alabama and Georgia	967	919	1,064	1,111	1,162	1,176	1,230	1,302	1,289	1,254	1,192	942	13,608	11,411
Eastern Missouri, Iowa, Minnesota and South Dakota‡	711	499	887	1,347	1,552	1,461	1,444	1,632	1,591	1,515	1,220	817	14,676	14,823
Western Missouri, Nebraska, Kansas and Oklahoma	315	388	867	1,063	1,130	1,147	1,110	1,170	1,122	992	859	512	10,675	9,893
Texas	304	339	422	405	392	389	454	481	399	429	399	393	4,806	4,566
Colorado and Utah	80	141	101	224	265	216	246	210	215	212	65	33	2,008	2,424
California	1,059	733	1,128	1,096	1,067	1,073	1,122	1,181	1,223	1,189	1,099	971	12,941	11,615
Oregon, Washington and Montana	76	192	239	393	377	394	404	423	395	424	323	224	3,864	2,983
	8,856	8,255	11,034	13.807	15,503	15,387	15,641	16,419	15,939	15,992	13,656	10,809	161,298	149,358

SHIPMENTS

Commercial district—	Jan.*	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.*	Dec.	1925	1924
Eastern Pennsylvania, New Jersey and Maryland	1,006	1,490	2,758	3,808	4,125	4,340	4,564	4,402	4,428	4,108	2,909	1,908	39,846	37,989
New York	148	206	445	771	907	986	1,045	1,001	1,072	977	609	352	8,519	7,436
Ohio, Western Pennsylvania and West Virginia	346	404	776	1,276	1,590	1,839	1,754	1,905	1,905	1,432	852	545	14,624	14,029
Michigan	191	254	428	865	1,201	1,320	1,322	1,285	1,245	1,062	585	309	10,067	8,991
Wisconsin,† Illinois, Indiana and Kentucky	705	601	1,214	2,140	2,586	2,553	2,743	2,914	2,697	2,014	1,211	629	22,007	21,344
Virginia, Tennessee, Alabama and Georgia	706	780	1,048	1,134	1,233	1,369	1,375	1,263	1,341	1,236	754	813	13,052	11,374
Eastern Missouri, Iowa, Minnesota and South Dakota‡	332	389	864	1,316	1,714	1,720	1,846	1,952	1,781	1,434	769	357	14,474	13,984
Western Missouri, Nebraska, Kansas and Oklahoma	220	468	803	1,029	1,169	1,095	1,187	1,268	1,055	972	818	438	10,522	9,587
Texas	280	374	422	451	429	444	463	452	372	335	356	342	4,720	4,488
Colorado and Utah	55	110	168	217	227	221	208	230	211	179	113	77	2,016	2,378
California	1,029	786	1,082	1,090	1,130	1,123	1,139	1,234	1,199	1,201	1,029	1,016	13,058	11,482
Oregon, Washington and Montana	144	153	271	297	424	491	485	477	405	359	182	128	3,816	2,966
	5,162	6,015	10,279	14,394	16,735	17,501	18,131	18,383	17,711	15,309	10,187	6,914	156,721	146,048

*Revised. †Began producing and shipping June, 1924. ‡Began producing December, 1924.



DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO, IN NOVEMBER, 1925

	Barrels	Value
Alaska	561	$1,989
Hawaii	3,063	6,804
Porto Rico	2,520	5,806
	6,144	$14,599

Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision. Imports and exports in December, 1925, not available.

Motion Pictures Show Uses of Dynamite

Motion pictures showing the story of dynamite and its uses in quarries and other work have been prepared by E. I. du Pont de Nemours & Co., Wilmington, Del., and are available upon request for public showing. The films are all on safety stock and will be loaned to responsible institutions, societies and individuals. "The Story of Dynamite" is of interest to all users of explosives and "Dynamite in Quarry Work" will be found valuable to all who operate quarries where blasting is one of the most important branches of the work.

The Story of Dynamite

This is a two reel picture requiring about one-half hour. It shows the manufacture of dynamite in the world's largest dynamite plant, starting with the raw materials and following them through the successive processes by which they are combined into the finished explosive; also the packing of dynamite for shipment, and some of the laboratory tests in connection with manufacture. The picture concludes with a series of striking views of the work of dynamite in coal and iron mining, in railroad construction, in the building of a great dam, in submarine blasting and in tunnelling and quarrying. The scenes for this film have been selected with the idea of giving in a short time a clear and interesting portrayal of the manufacture of dynamite and of the part it plays in the country's industries.

Dynamite in Quarry Work

This is a one reel picture requiring fifteen minutes. It depicts the use of dynamite in some of the best known quarries in the country and shows various methods of blasting, such as well drill, coyote hole and bench shots.

Owing to the boom in the state of Florida much cement is being shipped from the cement mills in the vicinity of Birmingham to Miami and other boom centers of the state of Florida. Much Birmingham cement is being used for buildings in Florida, while large shipments of it are going into Florida highways.

The city of Melbourne, Australia, is substituting wood blocks and concrete for macadam on its streets, chiefly to minimize the amount of dust in the city.

Demands for Cement Indicated by Reports to Shippers' Advisory Boards

Cooperation Between Shippers and Railroads Paves Way for Business in Future

That much commendable work is being done by the representatives of the cement industry in bringing about cooperation between shippers and carriers, is evidenced by the reports of meetings of the various shippers' advisory boards organized throughout the country. The mission of these boards is to form a common meeting ground between shippers and railroads for a better understanding of transportation questions, to adjust informally car difficulties which may arise between carrier and shipper and to give the shipping public a direct voice in the activities of the Car Service Division on all matters of mutual concern. Carriers and shippers are requested by the boards to give these proceedings the widest possible distribution among their officials and employes, with a view of enlisting their active cooperation in the undertaking.

Some of the important functions of these boards are summed up in an editorial in the *Cincinnati Enquirer* which followed the November meeting of the Ohio Valley Shippers' Advisory Board as follows:

> Their purpose is to "get together" to facilitate transportation throughout the year, to study and interpret traffic conditions, to speed up loading so that train equipment may be kept in motion and to arrange freight movement within the territorial limits of each regional board and in conjunction with movements in other territories that congestions, due to seasonal demands of crops and other traffic, may be eliminated.
>
> There is a great problem involved in this co-operation. There are more than 80,000 locomotives and more than 2,500,000 freight cars operating in the United States. All parts of the country are concerned with their proper handling for the most effective distribution of the nation's traffic. The purpose of the regional boards is to secure co-operation of all their members in a nation-wide effort to handle these facilities for the best service of all the traffic of the country. Much good has been done in bringing shippers and railroad traffic officials together. They are realizing, more than ever before, that their interests in this particular are mutual, that co-operation is the best way to help each other and to get the most out of the transportation facilities at their command.
>
> As to the results from this co-operation, their extent can not be expressed better than was done by Interstate Commerce Commissioner Ernest I. Lewis in a talk before the National Association of Railroad and Utilities Commissioners. Commenting on the work done by the Regional Boards, he said in part:
>
> "Carriers and shippers now meet voluntarily in regional conferences. These are amicable, affording personal contact of those who serve and those who are served. Jointly they analyze and forecast transportation demands. They must reach beyond mere local or sectional requirements and give due regard to the shifting seasonal and commercial demands of other sections and other industries and must formulate variations of that demand. The result of these new public relations is the heaviest traffic in the history of this country is being moved this year with fewer cars and locomotives than used in any recent previous year. There has been agitation for return to Government control and also for nationalization. We do not know what may rest in the future, but we do know that there has been brought into private operation and control of these facilities, on which our national prosperity is so dependent, a public participation in the management that thus far has produced impressively satisfactory practical results."

Figures on cement production and shipments as well as estimates of future car requirements for shipments are summed up for the various districts in the reports of the cement committees and these figures give an indication of conditions that may be expected for the current year.

W. S. Morrison of the Indiana Portland Cement Co. and chairman of the Cement Committee of the Ohio Valley Shippers' Advisory Board reported at the November meeting that the transportation situation in the cement industry in his territory was satisfactory on the movement of inbound raw materials as well as the cement shipments. One of the Ohio mills complained during the summer on the condition of equipment. This was promptly corrected by the two railroads serving the mill. Shipments for September and October were disappointing to the cement industry in the Ohio Valley board district. The excessive rains seriously retarded construction work and a number of contracts were carried over to 1926. Shipments for the balance of the year were entirely dependent upon weather conditions.

Information from the Indiana company's Indianapolis office was to the effect that it was indicated that the company's yardage for 1926 would be materially increased over the preceding year, due to many reasons, but principally to the fact that Kentucky will resume roadbuilding the first of July with ample funds available to execute a comprehensive program. Holdover work and contracts awarded during the first ten months of 1925 in the Columbus district amounted to 4,459,567 sq. yds., and up to November 1, about 70% of all the work under contract had been completed.

T. C. Taylor, chairman of the cement committee of the Southwest Shippers' Advisory Board, reported that shipments from the plants in Texas would be about the same for the first quarter of 1926 as for the same period, 1925. The car supply and transportation service had been very satisfactory. Stocks on hand were approximately the same as last year on account of recent rains, road building and construction work had been retarded, but with good weather, cement shipments were expected to show an increase.

Conditions in the Trans-Missouri-Kansas Regional Advisory Board district were reported by R. W. Moore, Chairman of the Cement Committee in that district, indicating that an active year was looked for in 1926. The following excerpts are from the report of the December 16 meeting:

> Shipments during the next three months will be governed largely by weather conditions, however, they should closely approximate shipments for the same months last year providing weather conditions are similar, and the requirements last year were 2,760 cars for January; 4,285 cars for February, and 8,335 cars for March, or a total of 15,380 cars. The committee is not in position to give an estimate at this time as to the outlook for 1926, on account of the fact that many contracts for next year's delivery will not be let until after the first of the year. The committee should be able to give a fairly accurate forecast for 1926 at the next meeting.
>
> With production and stocks each better than a million barrels greater than a year ago, the indications are that the year 1926 will be a very active one in the cement industry in this district, especially so, if road building programs are carried forward in the various states next year.
>
> At the Portland Cement Association meeting in Chicago last month, the question of co-operation of the mills in the Eastern Division that have not heretofore participated in the activities of this Board to any great extent was taken up before the Transporta-

tion Committee of that body and we now have reasons to believe that the Eastern mills will co-operate in a very satisfactory manner.

J. L. Griffith, chairman of the Cement Committee of the Southeast Shippers' Advisory Board submitted the following report at the December 11 meeting of the Car Service Division of the board:

Our car requirements for the next ninety day period will be approximately as follows:

Alabama	7200
Georgia	2800
Tennessee	5300
Total	15,300 cars

During the past three months we have experienced a car shortage at several of the plants, but the situation now has been relieved. The service rendered by the Southern Railway during the past three months has not been up to the standard. Three plants located on the Southern Railway report serious delay in handling their traffic. At Chattanooga there have been delays ranging from three to ten days on shipments moving out of Chattanooga to connecting lines with the Southern Railway. The plant at Clinchfield, Georgia, reports that it often requires more than a week for the Southern Railway to transport their shipments to Macon, Georgia, a distance of thirty-one miles.

We also have a complaint from the plant located at Spocari, Alabama, as to the delay in handling shipments, especially emphasizing the delays on shipments delivered to Southern connections at Atlanta, Georgia.

The condition of the equipment placed for the loading of cement has been fairly good on the whole, only one report having been received of dirty cars being placed for the loading of cement, and the individual cases were handled with the lines at fault.

The situation in the Pacific Northwest is summarized and some interesting facts bearing on imports of cement from Europe into that territory are contained in the report of W. G. Perrow, Commodity Chairman, and Gordon Tongue, Commodity Vice-Chairman of the Cement and Concrete Products Committee. The report which was made in December at the first regular meeting of the Pacific Northwest Advisory Board, is prefaced with a brief statement concerning the cement industry in general as well as in the territory in the Pacific Northwest. The report, from which the following excerpts are taken, also gives figures on the absorption or consumption of cement in the states covered by that board compared with the country as a whole, and classifies the general use of cement under nine general heads.

The tonnage reports of the individual manufacturers resemble those of a trunk railway system and in many other respects the industry is analogous to that of rail transportation. Perhaps this accounts for such a goodly number of ex-railway men now associated with every branch of the industry.

That the Board members in this and other territories may have some idea of our consumption of their products, the following are some of the important items entering into the manufacture of cement based on consumption in the year 1924:

Coal	11,000,000 tons
Crude oil	5,000,000 bbls.
Dynamite	17,000,000 lbs.
Lubricating oil	41,000,000 "
Cotton for bags	3,250,000 "
Paper for bags	19,000,000 "
Fire brick	5,800,000
Capital invested (U. S.)	$450,000,000
Annual payroll	$ 65,000,000
Number of employees	38,000

To illustrate: To manufacture a barrel of portland cement weighing 376 lbs. requires about 600 lbs. of raw material, limestone, slag shale, gypsum or their equivalent, and 200 lbs. of coal or its equivalent. This raw material is in most instances transported by rail from varying distances up to several hundred miles.

Reckoned in accomplishments, it is a wide span from the first portland cement mill on the Pacific Coast built in 1884, to the present date. It is little known that about ten years in advance of the great development in the industry affected in the Lehigh district of Pennsylvania there was constructed at Oregon City, Oregon, a plant capable of turning out 100 barrels daily of true portland cement. Had the raw material supply not been limited, forcing the abandonment of the plant about six years later, the history of the industry on the Pacific Coast might have been different. For many years following the closing of the Oregon City plant the Pacific Northwest was supplied by European mills, this was followed in 1898 by a supply from California.

Cement mills now operated in the Pacific Northwest, including two mills in Montana, for comparable purposes but not included within the jurisdiction of this Board are:

Location of Plant	First Shipment	Daily Capacity in Bbls. Original	Present
Concrete, Wash.	1906	600	5,000
Bellingham, Wash.	1910	2,000	2,000
Metaline Falls, Wash.	1911	2,000	2,000
Irvin, Wash.	1913	2,000	2,000
Oswego, Ore.	1916	1,150	1,150
Gold Hill, Ore.	1920	1,000	1,000
Lime, Ore.	1923	1,150	1,150
Trident, Mont.	1907	1,500	2,250
Hanover, Mont.	1918	1,000	1,000

Annual Capacity of Nine Cement Plants, Production and Percentage of Capacity Used
Oregon, Washington and Montana

	Capacity	Production	Percent of Cap. Used
1922	4,858,000	2,942,000	60.6
1923	5,270,000	3,105,000	58.9
1924	5,270,000	2,975,000	56.5
1925	5,650,000	*3,600,000	63.7

(*Estimated for November and December)

The portland cement industry has learned the value of cooperation with transportation companies and in the true spirit is constantly striving to do its part. While the tariff minimum of cement is normally and by necessity, 25 tons, the average loading by the industry during 1924, for the United States was 38 tons per car. The estimated average loading for the first ten months of this year has been 200 barrels per car (Tariff minimum 132 bbls., or 50,000 lb.), and the percentage of market capacity utilized of all equipment furnished was .95. This can be best appreciated when you understand that the major portion of equipment employed in this section is of 80,000 or 100,000 lbs. capacity. Equipment furnished for cement loading is fairly clean from dunnage and debris. Some mills, however, report a lack of cooperation on the part of carriers and this offers an opportunity to the Committee to be of service if individual companies cannot secure proper attention by direct dealing.

European portland cement is being dumped at Pacific Coast ports in large quantities and offers a very serious problem to the local manufacturer whose sales are already far below production capacity. This cement is duty free in nearly every instance and as steamship space from Europe to Pacific Coast ports is in excess of the demand the rates are very low, in some instances as low as $3.50 per ton, virtually ballast. As this cement is consumed principally at the water points it is mentioned here as being of interest to rail carriers as having the effect of materially reducing the tonnage offered for rail transportation. Labor cost in European mills is reported as 16.2 cents per hour as compared with an average of 62.5 cents per hour in the United States. These receipts in barrels during 1924 and 1925 at Puget Sound and Columbia River ports are as follows:

	1924	First eight months, 1925
Oregon	34,094	68,678
Washington	126,512	127,679

For every barrel of European cement consumed here there is a corresponding reduction in domestic manufacturing, reducing correspondingly payroll, transportation requirements and raw products consumed, representing transportation reduction of about 2,142 carloads of 50 tons each.

Conditions in the local portland cement industry indicate a decrease in production and shipments for 1926, due to fewer large contracts in prospect.

Following are estimated car requirements for the first quarter of 1926:

West of the Cascades	1,625
East of the Cascades	450
Total	2,075

Straight Line Cement Plant Patented

Patent by John C. Buckbee Covers Design Followed at Petoskey Plant

A patent covering straight line cement plants has been issued to John C. Buckbee, president of J. C. Buckbee & Co., engineers, Chicago, Ill. The development of the straight line plant by Mr. Buckbee is the result of a great many years of experience and effort and the construction of a plant on the straight line idea results in many economies both in construction and operation.

The Buckbee organization is well known in the field as a designer of cement plants, rock crushing plants, power and industrial plants.

One of the complete cement plants of Buckbee design, the Petoskey Portland Cement Company's plant at Petoskey, Mich., was described in detail in an earlier issue of the Cement Mill Section of Concrete. The straight line idea was followed in the lay-out of the Petoskey plant.

The patent paper, No. 1,561,213, issued under date of Nov. 10, 1925, is presented in full in the following, including reproductions of the drawings.

STRAIGHT-LINE CEMENT PLANT

To all whom it may concern:

Be it known that I, John C. Buckbee, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Straight-Line Cement Plants, of which the following is a specification.

The present invention relates to the manufacture of cement and more particularly has to do with the construction and arrangement of the plant and its equipment.

The main and primary object of the invention is to provide a plant wherein the highest economy of time, labor and expense may be effected in its construction, as well as its maintenance, and in which the operations in the treatment of the material from the raw state to the finished product may be accomplished with distinct savings in the cost of such operations.

Furthermore, the invention contemplates the provision of a plant of the character set forth in which the relation of the several units is such as to permit expansion of enlargement of the plant, as such may be required, without impairment of the original installation, and without the necessity of discontinuing the operation of the plant during the period in which such expansion or enlargement may take place.

A further object of the invention is to provide a plant of the character described in which the passage of the material, and the sequence of operations thereon, is in a direct line from the time that the material in its raw state enters the plant until it emerges therefrom in the finished product. This economizes in the area covered by the plant, so that undue waste in the space on which the plant is placed is overcome, and likewise minimizes the time for treatment of the material, thus enabling the finished product to be produced at less expense and with greater facility and ease than under the conditions hitherto existing in the manufacture of cement.

Having these general objects in view, and others which will appear as the nature of the improvements is better understood, the invention consists substantially in the novel construction, combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and finally pointed out in the appended claim.

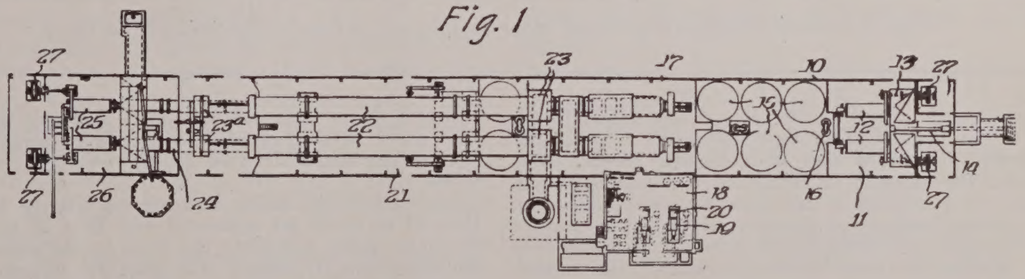
In the drawings—

Figure 1 is a sectional plan view of a straight-line cement plant constructed in accordance with the present invention.

Figure 2 is a central longitudinal sectional view thereof.

Figures 3, 4, and 5, are transverse sectional views on the line *3—3*, *4—4* and *5—5*, respectively of Figure 2.

As before premised, it is the object of the present invention to provide a straight-line cement plant in which the passage of the material, and the sequence of operations thereon, is in a direct line from the time that the material in its raw state enters the plant until it emerges therefrom in the finished product. To this end the invention contemplates a plant of this character all of the departments of which are housed under a single roof and which are in line with each other so that as the material passes from one department to the other it will follow a direct path, and thereby



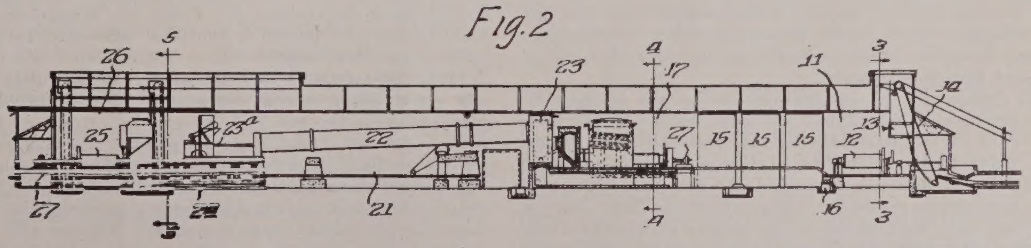
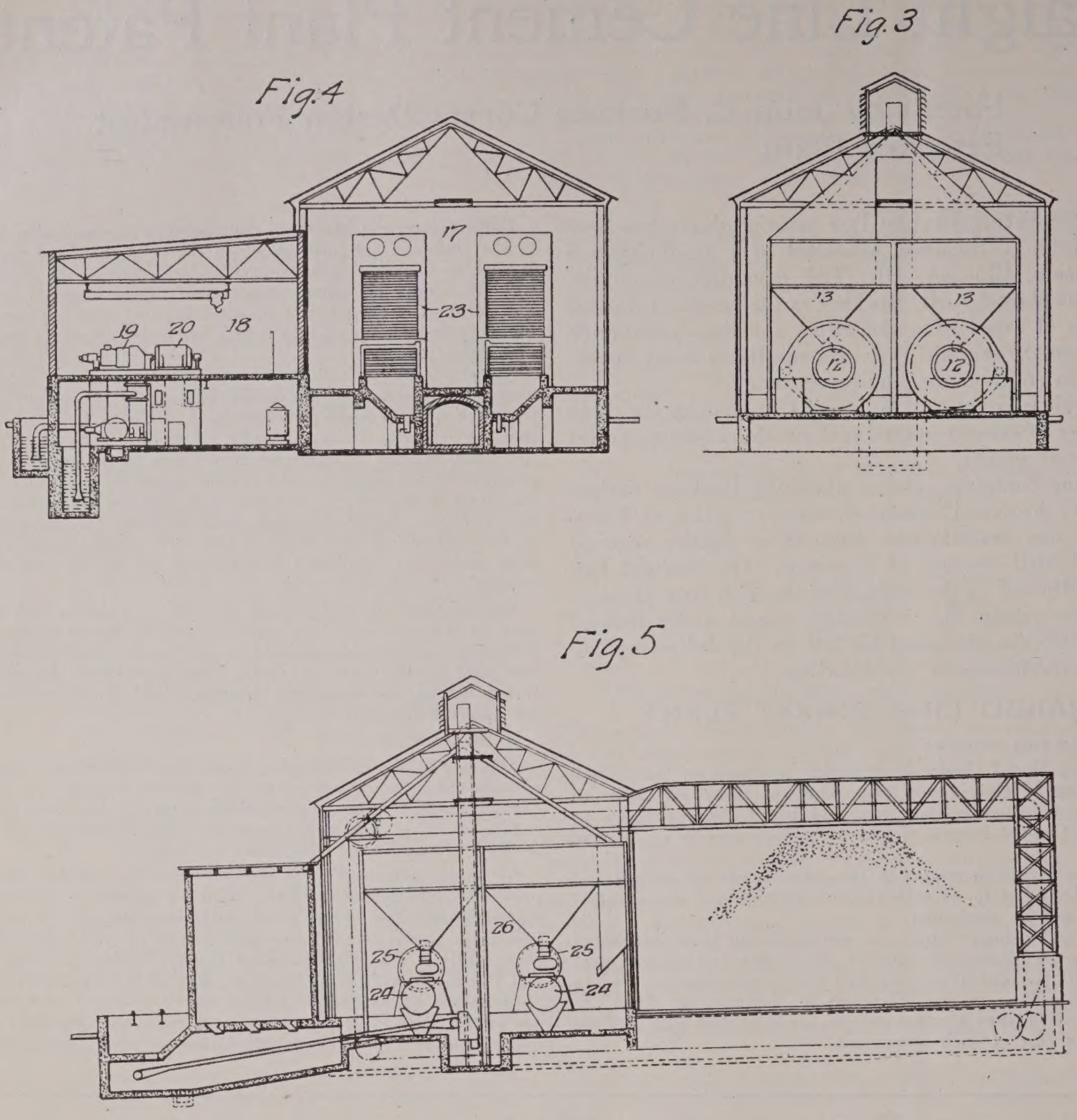


Fig. 1—Sectional plan view of straight line cement plant

Fig. 2—Central longitudinal sectional view



Figs. 3, 4 and 5—Transverse sectional views on lines 3-3, 4-4 and 5-5 as indicated in Fig. 2

avoid the necessity for utilizing transfer devices and apparatus for transportation of the material to the separated points in which the various departments heretofore have been located. Having these features in mind, the numeral *10* designates the housing of the plant. This may be a building of any desired construction in accordance with modern engineering practice, and it may be formed of any desired material. By reason of the utilization of the present invention, the structure *10* need be of only relatively low height and only sufficient to accommodate the apparatus and equipment disposed therein. Likewise, by the utilization of the invention the width of the structure *10* may be relatively narrow, and because of its construction to accommodate disposition of the various units in a direct line, the structure is devoid of pronounced angular projections, thus adapting the same for the construction of extensions laterally thereof if it be found desirable to increase the size of the plant and the equipment therein.

The raw mill department *11* occupies one end of the housing *10*. Within said department are included the usual mills *12*, raw bins *13* and elevator *14* for transferring the raw material from an external storage point to the bins *13*. In line with the equipment of the raw mill department just described are the slurry tanks *15* into which the material is passed by pumps *16* or the like. Next in line with the raw mill department is the boiler department *17* of the power plant, and here are located boilers which utilize the waste heat from the kilns through which the material is passed as it advances through the plant. At one side of the boiler department *17*, and forming part of the same, is a power station *18* in which are located electrical generators *19* operated by turbines *20* which derive their power from the boiler of the department *17*. This power station affords the necessary energy for the electric motors, hereinafter referred to, by which the several units are driven.

In line with the boiler department *17* is the kiln room *21*, the kilns *22* of which are connected with flues *23* by means of which the waste gases pass from the kilns to the waste heat boilers in the department *17*, where said gases are utilized in the firing of these boilers. The opposite ends of the kilns *22* are in line with the powdered coal firing apparatus 23^a by means of which the kilns are heated, the kilns discharging into cooling apparatus *24* from which the material finally passes to the grinding mills *25* of the finishing department *26*. From this department *26* the finished material may be passed by suitable conveyors to a stock house or other point of storage.

From the foregoing description it is evident that the arrangement and construction herein delineated affords a straight-line cement plant wherein the material, once it is introduced in the raw state, passes in a direct line from the point of its first treatment, through its intermediate stages of treatment, and to the point of final finishing, so that the apparatus utilized in such treatment is arranged in a direct line, the various departments receiving the material directly from the preceding departments, and without any deviation of the material from such direct path so long as it traverses the several departments in which the same is subjected to treatment.

Various electrical driving units *27* are employed for the operation of the different units, thus affording independent driving of these units, with utilization of power derived from the station *18*.

The power plant thus is centralized, and the power distributed in a highly advantageous and economical manner, and the compact arrangement of the several treating departments enables the operation and maintenance of the entire plant with maximum economy of time, labor and expense.

While the plant herein illustrated is of the wet type, it will be understood that the invention is equally adaptable to dry plants. In such event the slurry tanks *15* are replaced by bins for the raw material in a dry state.

I claim:

A straight-line cement plant of the class described, comprising a raw mill department, a power station, a kiln department, and a finishing department sequentially arranged and in a direct line with each other, whereby the material introduced in its raw state passes from the raw mill to the finishing department in a direct line.

In witness whereof I have hereunto set my hand.

JOHN C. BUCKBEE.

Chee Hsin Cement Co. Celebrates Centenary of Cement

Officials at Meeting Give History of Chinese Cement Industry

By M. H. CHOW

The centenary of the cement industry found expression in China in 1925 in an exhibition organized by the Chee Hsin Cement Co., the leading firm of this kind in China, at the National Grand Hotel. A reception of contractors and metal dealers was held in the afternoon, these being welcomed by Y. C. Ting, of the Chee Hsin Cement Co. This was followed in the evening by a dinner at which numerous "cement" speeches were delivered.

The exhibition was arranged on exceedingly informative lines and one did not need to be an expert to acquire a fairly comprehensive idea of the processes used in the manufacture of cement. An outstanding exhibit was the scale model of part of the plant at the Chee Hsin Cement Company's works at Tangshan, which enabled the visitor to follow the methods employed from the mixing of the raw materials to the completion of the finished product. Other interesting exhibits included machines for testing the strength of cement briquettes, for testing the setting time, etc. These were kindly lent by the British Municipal Council. Then there were drums for packing the cement, concrete railway sleepers and tiles of all sorts. As a sideline there was an excellent display of Chinese pottery. There was also much literature supplied by different firms, including Messrs. F. L. Smidth & Co.

Valuable information was given by means of placards describing how the raw materials are first carefully analyzed by experts, then scientifically proportioned by sensitive weighing machines, after which they are burned in kilns at a temperature sufficient to melt steel. Another placard gave statistics relating to fire losses in various countries which might have been avoided by the use of cement in buildings.

The dinner at the National Grand hotel in the evening was one of the largest functions of its kind ever held in Tientsin, some 200 or more guests of many nationalities, being accommodated in the large dining room. An excellent foreign dinner was served.

T. S. Lu, one of the directors of the company, presided, and welcomed the guests with a few apt remarks.

Historical Development of Cement

H. F. Barnes, chief engineer of the British Municipal Council, gave a most interesting address on the historical development of the cement industry. His remarks included the following interesting facts about the cement industry in China:

The Industry in China

The first manufacture of portland cement in China was started by the Chee Hsin Cement Co., which dates back to 1886. Since its foundation this company has progressed steadily, both increasing the quantity and improving the quality of their products and any one who has had the pleasure of going through their works at Tangshan will realize what a thoroughly modern and up-to-date plant in every respect they have at that point.

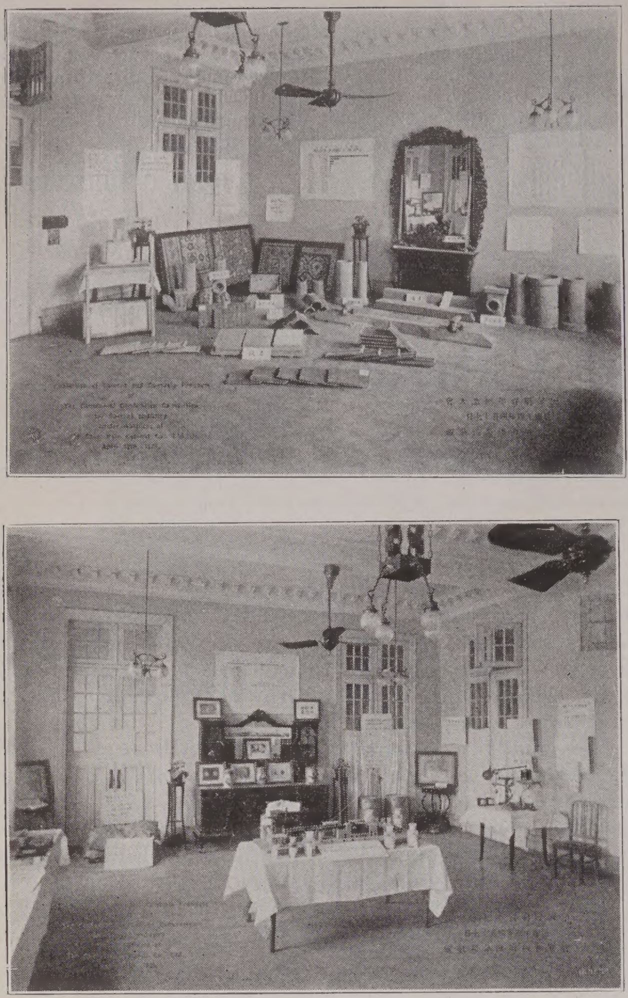
This company anticipates its output will reach a total of 5,000,000 casks per annum in the near future. The company has had great difficulties of many kinds to face, including hardships due to interruption of communications owing to military operations in China during the last few years. That is only one of the many troubles it has had to contend with. The Chee Hsin Co. is the largest producer, as well as the old producer, of portland cement in China.

Cement and Engineering

K. Y. Kwong, formerly chief engineer of the Peking-Suiyuan Railway, and one of the oldest foreign-trained engineers in China, in behalf of the members of the Institute of Chinese Engineers extended to the Chee Hsin Cement Co. hearty congratulations on the great success the company had attained. As a pioneer Chinese portland cement manufacturer he thought, after looking at their exhibits, that the company deserved every praise. He continued:

"I have no data as to when portland cement was first imported into China, but I do not think I am far out in saying that the Chinese people knew very little about the material or used it in a very great quantity until mining enterprises were undertaken and railroad building commenced.

"They were called by the masons 'Yang Hui' or foreign lime, 'Si-men-tu' or cement earth, 'Sui Nee' or hydraulic mud. The first is a Northern name, while the last two are Southern names, and by these they are known to the people and will remain so in the Anglo-Chinese dictionary. Imported cement was so expensive in the past days that engineers in China could only use it in important works and where the presence of water rendered the use of lime impracticable. I remember when during my experience, and in the days of imported cement, when the cost laid down at the site of construction work was so high that every precaution had to be taken to prevent waste by the men handling it, but in spite of constant warnings very few men took any notice of it, until an idea struck me. The next time I saw a coolie throw cement about where it would go to waste I yelled out that they should not throw away cement like that. This 'Yang Hui' costs as much as wheat flour and surely they would not waste flour like



Exhibitions of cement and concrete products at the Centennial Celebration Convention for the cement industry in China under the auspices of the Chee Hsin Cement Co.

that. 'Oh,' they cried, 'we did not know that this 'Hui' is so expensive; we shall be careful in the future,' and they remembered.

"With the production of a native product the demand for cement increased in leaps and bounds. It would, in many classes of work, replace stone and brick and when the country is more developed the annual consumption will not fall short in comparison with any other country. There is not a piece of engineering work today that cement does not compose a part of its building material. Even the wooden railway sleeper will eventually be replaced by reinforced cement concrete ones. Take a walk out on the streets of any modern city and in this very foreign settlement of Tientsin you are faced with cement concrete structures, cement electric lamp poles, side walks, etc. This shows that cement is costing less and it is economical to use it rather than other material. What would have cost one a small fortune to construct a fire-proof building in the past can now be done with reinforced cement concrete at a comparatively low figure."

Cement and Chinese Industry

K. P. Hu, an able foreign-trained engineer in the Chee Hsin Cement Co., speaking in English, dealt with the application of cement to industry. He referred to the great growth of the use of cement in the United States. The record of the cement industry in China was not less surprising. It took its greatest jump during the European War, when modern industries like cotton and flour mills began to spring up. The production of cement in 1924 was actually three times as much as in the year before the war. The vast growth of the use of cement in industry in the United States indicated how vast would be the demand for it in the similar development of China, which was still very backward in railway construction, in drainage and sewerage systems, in highways, and other things. A proper system of irrigation and conservancy was the only means of improving the land. Improper drainage in some parts of China resulted in the agricultural land being too wet, while in other cases the land was too dry.

When these needs were met cement would be one of the main factors. Mr. Hu referred to the progressive outlook of his company, and to certain new developments in cooperation with engineers for the further use of cement. He concluded by saying that this Convention was significant not only because of its marking the centenary of cement, but because this was the first time that manufacturers of cement, engineers, and industrialists had come together with the object of furthering industrial and building activities which would contribute to the comfort, convenience and happiness of human life.

The Pioneers in China

Li Shi-ming, of the Chee Hsin Cement Co., gave graphic details and figures revealing the growth of the pioneer cement producer in China.

"In 1886 the Chee Hsin Cement Co. was only consisted of a small building housing one brick kiln. Today, it has owned 2,000 mous of limestone and clay quarries and over twenty buildings, namely 3 spacious kiln houses, 1 coal grinding mill, 1 packing plant, 1 cooperage shop, 4 drying towers, 2 clinker storage houses, 1 big machine shop, several office buildings, 2 go-downs, a number of dormitories and all sorts of railway sidings.

"Thirty-nine years ago we produced only 20,000 barrels a year. Today we can turn out 2,200,000 barrels, almost 110 times as much within the interval of 39 years.

"In 1886 we employed crude vertical kilns similar to the one of Aspdin's as you have seen in this program. Now we use electrically driven motors and 250 ft. long rotary kilns and all sorts of labor-saving devices for conveying and transmission. To extract maximum amount of heat from coal we maintain most economical pulverizing equipment. As you know, the strength of chain can only be determined by its weakest link, the permanence and strength of any reinforced concrete construction entirely depends upon highest grade quality of cement. Therefore, the essential quality of cement is uniformity, which can only be brought about through uniform good quality of limestones and clay quarries, which we fortunately possess in abundance. The uniformity is further insured through strict chemical control and testing which we have faithfully carried out at our well equipped chemical laboratory and research department. All these improvements we have made from time to time tend to increase the efficiency of our manufacture and improve the quality of our products for the benefit of the consuming public.

"In 1914 we took over the management of the Hwa Kee Hupeh Cement Works, thus increasing output by 250,000 barrels more. However, the increase of our production at that time was still not sufficient to meet the rapidly increasing demand for cement during the period of European War, especially that after it when cotton mills and exchange institutions sprang up like mushrooms in China. Our management at once ordered another complete set of cement machinery, thus increasing our present output to 2,200,000 barrels a year.

"Although we are fortunately endowed with these natural advantages, we are constantly striving hard to avail ourselves of the most modern up-to-date mechanical conveniences, such as automatic filling devices with the sole

Dinner given in connection with the Centennial Celebration Convention for the cement industry at the Grand Hotel, Tientsin, China

object to increase our production and to insure our prompt delivery of the goods and to give our satisfactory service to all of you as we can. For this purpose we have installed a very complete machine shop and a cast steel plant to manufacture several new units of cement machinery and all its accessories in order to further enlarge our production for the benefit of our consumers."

Many congratulatory messages were received and read out at the dinner. Mr. Yen Teching conveyed the best wishes of the Minister and Vice-Minister of Communications, Mr. Raider spoke for the Chinese and American Engineers' Association, and among other messages read out were those from the Science Society of China, the Chinese Engineering Society, Chinese Institute of Engineers, the Society of Science and Arts, etc.

Biennial Census of Manufacturers in Preparation

The Bureau of the Census is now engaged in collecting the data for the biennial census of manufactures, which will cover industrial operations during the calendar year of 1925. This census is required by an act of Congress approved March 3, 1919.

The schedules or questionnaires have already been mailed to all the manufacturers. Our Cement Mill Section of CONCRETE is very much interested in the success of the census, which will depend not only on the accuracy of the statictics but on the promptness with which they are published. The Director of the Census has agreed to make a tabulation for each city within a few weeks after the receipt of the last schedule, *properly and accurately filled out,* and to publish the results of this tabulation in the form of a preliminary report.

At the census of 1923 it was necessary to send more than 100,000 letters to manufacturers requesting additional information or verification or correction of their reports. This, of course, delayed considerably the publication of the statistics. It is highly important, therefore, that you answer each question as accurately as possible and that you mail your report *promptly* to the Bureau of the Census.

In preparing your schedules, care should be taken to answer each inquiry that applies to your operations. Do not combine items that are called for separately. If you can not give exact figures, careful estimates will be accepted by the Census Bureau. In answer to Inquiry 6, the value of production, *not sales,* is called for. The sales during the year may considerably exceed or may fall considerably below the production during the year. Where no exact records of production are kept, the value of the production for the year may be ascertained by adding to the value of goods sold, the increase in the stocks of finished goods (or stocks in the process of manufacture) on hand at the end of the year as compared with the beginning of the year, or by deducting the decrease in such stocks from the value of goods sold. For example, if the sales during the year amounted to $50,000 and the value of stocks on hand increased from $10,000 at the beginning of the year to $15,000 at its close, the value of the production during the year would be $55,000; but if the stocks on hand decreased from $10,000 at the beginning to $5,000 at the end of the year, the value of production would be only $45,000.

We urge all manufacturers to co-operate with the Bureau of the Census in making the coming canvass in the shortest possible time and the most economical manner. These figures are published for the benefit of the manufacturing industry and the usefulness of census statistics is increased by making them available at an early date.

Buenos Aires Warehouse Built in Record Time

What has been termed the most rapid piece of construction work ever carried forward in Argentine, if not in all South America, is now nearing completion at Avellaneda, in the Province of Buenos Aires, directly adjacent to the city of the same name, according to the *International Bulletin.*

On a Wednesday morning of one week none of the structure was visible above ground. Only the forms were in place. On the following Wednesday the pouring of the concrete was finished. In seven days six huge silos, each 90 feet high, with a total base area of 6,338 sq. ft. were erected.

Silos erected for the Argentine Portland Cement Co., near Buenos Aires

The silos are part of a packing unit being erected for the Argentine Portland Cement Co., an International subsidiary. Storage will be provided for 425,000 sacks of cement. The Argentine mill is located near high-grade raw materials, at Sierras Bayas, about 200 miles from Buenos Aires. While excellent railroad facilities are afforded for the shipment of the finished product, these new storage silos are intended to relieve the pressure upon the railroad during the months of heavy crop movement and assure uninterrupted cement service. The silos and packhouse have been so constructed that they can be made an integral part of a new mill, if conditions in this progressive country call for such expansion.

Remarkable Claims Made for French Cement

"Ciment de Vassy" of Higher Quality and Lower Cost Than "Ciment Fondu" or Other Alumina Cements

By THEODORE WOLFRAM
Paris, France

Down near the center of France in the department of Yonne is a small town, Vassy, which has been quite unknown and quite unimportant up to the present date but if the claims of the cement producers of the region can be proved and the cement can be produced in sufficient quantity Vassy is due for a decided boom.

The cement of Vassy is no new discovery as the records show that in 1850 Honore Gariel, a noted French geologist whose home was in Avallon near Vassy, discovered promising traces of lime in the region and installed a small cement producing plant at Vassy and proceeded to turn out cement by a laborious and slow manual process.

From that small beginning the cement industry of Vassy has gradually increased until there are at the present date no less than twenty-five open quarries and eight mills with an output of from 800 to 1,000 tons of cement per day.

The lime bearing rock of Vassy is slightly bituminous, blue-gray in color and very fine grained. In the furnaces it loses 40% in weight and comes out a yellow-brown. Its chemical composition before and after burning, according to tests in the laboratories of the City of Paris is as follows:

	Silica	Alumina	Lime	Iron	Divers	Sand	Magnesium	Sulf. Acid
Before burning	19.4	5.9	63.7	3.0	8.0	—	—	—
After burning	20.5	9.3	50.9	5.5	6.7	3.3	0.3	3.5

The chemical composition of the lime bearing rock is practically identical in all of the quarries of the region and this in itself is a decided advantage to the consumers.

Since the remarkable success of various forms of rapid setting cements such as the "Ciment Fondu" and other alumina cements it is interesting to note the claims set forth by the producers of the "Ciments de Vassy" and apparently substantiated by practical as well as laboratory experiments.

Instead of the eighteen hours which "Ciment Fondu" requires for setting, it is claimed that these cements are set and ready for use in a much shorter period, depending on conditions and use. They set equally well under water and resist the action of salt water as well as being unaffected by extreme changes in temperature.

Their weight in powdered form varies according to the modes of preparation but ranges from 1,400 to 2,000 pounds per cubic meter. It is the lightest of cements and as it is usually mixed with an equal proportion of sand it offers great economies to the user. In many cases the amount of sand used can be increased to a proportion running as high as five parts of sand to one of cement in the case of ordinary masonry.

The "Ciments de Vassy" have withstood the tests of such difficult pieces of construction as the docks and structures of various types at the seaports of Havre, Caen, Cherbourg, Henfleur, Dieppe, Lorient, Brest, Marseilles, Toulen, Alger, Constantinople and Dakar. They have also been successfully employed in the sewerage systems of Rennes, Orleans, Melun, Nancy, Rheims, Angers, Troyes, Auxerre, Semur, Vichy and Nantes and also as well as being used in the construction of the tunnels and reservoirs of the Paris water supply system and various other towns and cities of France.

It would appear that this cement has all the advantages claimed by the alumina cements besides many great advantages not possessed by these, and can be produced at a much lower cost. Besides this the town of Vassy is centrally located in regards to all parts of France and is midway between the cities of Paris and Lyons. The advantage of this location is easily seen when it is noted that one of the greatest of the French "Ciment Fondu" firms is obliged to transport its bauxite from its mines near Beziers in southern France down to the seaport of Cette where it is loaded on canal barges and towed practically across the entire country to the mills at Vitry-la-Francois and the finished product faces another long haul before it arrives at any of the French industrial or commercial centers.

Belgian Cement Manufacturers Have Association

Important cement manufacturers in Belgium have formed an association, "Groupement Professionnel des Fabricants de Cement Portland Artificiel en Belgique" whose aim it is to popularize the uses of portland cement, and who also look after the general and professional interests of the Belgian cement industry. Manufacturers who are members of the association have agreed of their own free will to have a mutual and very severe control exercised over all their products, by an official laboratory which is quite independent of all manufacturers and may thus be depended upon to be impartial.

All cement produced by the affiliated companies may thus be considered as complying with the requirements of the most rigid specifications issued by the countries to which it is being exported.

Recent attacks upon the reputation of Belgian cement in the United States are attributed by the members of the association to unscrupulous intermediaries who happened to be selling inferior qualities of cement which did not comply with the A. S. T. M. specifications. It is claimed that the reputable concerns suffer through such practices and it is to insure the good reputation of their products that they have formed a group and instituted a severe control on all exported portland cement.

The Societe Anonyme Cimenteries and Briqueteries Reunies which was formed by the merger of several companies with seven plants in different parts of the country, and at the present time probably the most important concern for the manufacture of portland cement in Belgium, has become an important exporter of portland cement and this control is particularly severe at all its works, the brands being guaranteed to exceed A. S. T. M. requirements.

International Corporation Adopts One Brand

"Lone Star" Becomes Brand Name for All International Subsidiaries in United States

Effective January 1, the International Cement Corporation began marketing the product of all of its domestic subsidiary companies under the brand name, "Lone Star Cement." Up to that time this name was used by International's two mills in Texas, the mill recently opened at Norfolk and the mills acquired last summer in Birmingham and Indianapolis. The adoption of a single brand name is dictated by a desire to have one name throughout the entire country to stand for manufacturing and marketing policies which are common to all International plants. The trade has already become accustomed to the use of the new brand name which has for some time been affixed to the old brand names. Knickerbocker cement produced in International's New York mill, for instance, has been sold under the name "Knickerbocker cement—Lone Star Brand," etc., for the past year.

Announcement of this change is made in the January issue of the *International Bulletin*, a publication which is distributed for the information of stockholders of the International Cement Corporation. This reads in part, as follows:

"The name 'Lone Star' is a symbol. It stands for a quarter of a century of cement-making experience; a process of manufacture that has made cement production an exact science; a human, neighborly understanding of the problems of the cement user and the cement dealer; a code of fair business dealing.

"While selling their product under one brand name, the various International subsidiaries maintain undiminished their strictly local character. Indeed one of the underlying reasons for the System's success has been the fact that the local members are integral parts of their respective communities."

This announcement also re-emphasizes the advantages of marketing cement through the building supply dealer. On this subject the International Bulletin says:

"Between the domestic mills and the user of Lone Star cement there is but one step—the building material dealer. Ninety-six per cent of the cement produced by International is sold through this channel. The old axiom that a straight line is the shortest distance between two points never found stronger proof than in this industry. The directness of marketing through but one intermediary is economically sound. It serves to bring Lone Star cement to the buying public cheaper and more efficiently than any other method ever devised."

The International Bulletin also announces that the International mills now furnish with every shipment of Lone Star cement a certificate by the chief chemist of the plant certifying to the fact that the cement will meet or exceed all requirements of the U. S. Standard specifications.

The International system at present consists of ten allied companies operating ten cement mills which have a combined capacity of twelve million barrels annually. These companies are: Alabama Portland Cement Co., Indiana Portland Cement Co., The Kansas Portland Cement Co., Knickerbocker Portland Cement Co., Inc., Louisiana Portland Cement Co., Texas Portland Cement Co., Virginia Portland Cement Co., Argentina Portland Cement Co., The Cuban Portland Cement Corp., and Uruguay Portland Cement Co.

Weekly Talks on Safety in This Plant

Every Thursday noon at the plant of the Lawrence Portland Cement Co. in Northampton, Pennsylvania, a half hour talk on safety subjects is given to men from various departments. They are known as the "Thursday Talk" meetings and have come to be quite popular with the men. Better cooperation among the men in regards to their treatment of safety subjects has been brought about the small groups which attend these meetings. A group of twelve to sixteen men attends the meeting each week and this group is changed from week to week so that all the men employed in the plant will have an opportunity to get in on the meetings. David Adam, safety engineer, talks on accident prevention and leads a discussion on any accidents which have occurred during the week in plant. Other interesting happenings are brought up and the men are given the chance to ask questions or o make suggestions.

One of the groups attending a safety talk at the plant of the Lawrence Portland Cement Co.

On January 1, 1926, general offices of the Pennsylvania Crusher Co. were moved to a new location on the 19th floor of the new Liberty Trust Bldg., at the corner of Broad and Arch Streets, Philadelphia.

This business, started by George W. Borton in 1897, and continued as Borton & Tierney, a partnership, was incorporated as the Pennsylvania Crusher Co. in 1905, with headquarters in a small room in the Stephen Girard Bldg.

The office space has been extended from time to time in response to the demands made by growing volume of business and personnel, until at the close of the company's largest year, inability to secure additional room necessitated this move.

Indiana Portland Cement Co. Installs New Dust Collecting Units

The Indiana Portland Cement Co., Greencastle, Ind., recently placed an order with the Northern Blower Co., Cleveland, Ohio, for three additional Norblo dust recovery units. The four units already installed are of the cloth screen arrester type and are used in the bagging department. The new units are for removing the dust from the compeb department, and are of the Norblo continuous suction air-filter type. They are designed for high recovery percentage and continuous operation. The dusty air first enters a cyclone arrester which collects all oversize material in suspension. Thence it passes to the air-filters. These consist of cylindrical steel-cased units, each having twelve filter bags. Each unit is cleaned periodically and successively at intervals of three minutes or less by means of air-reverse valves which automatically change the direction of the air flow and shake off the accumulation of dust on the bags; thus assuring constant filtering efficiency. Counter-weighed airtight gates at the bottom of the respective units automatically release the dust accumulated in the hoppers at intervals.

Babcock & Wilcox Co. Purchases Fuller-Lehigh Co.

The Babcock & Wilcox Co., announces that it has purchased the Fuller-Lehigh Co., and its subsidiaries, manufacturers of pulverized fuel and cement mill equipment; also that it has purchased the Bailey Meter Co., manufacturers of meters and recorders, combustion control equipment, pulverized fuel feeders,and water cooled furnace walls. The Fuller-Lehigh Co. and the Bailey Meter Co., will be operated with the same organization as heretofore, with the exception that Col. J. W. Fuller will become chairman of the board of the Fuller-Lehigh Co., E. G. Bailey will become president, and A. E. Douglass of Fuller-Lehigh Co., will become vice-president in charge of sales. Mr. Bailey will continue to act as president of the Bailey Meter Co., and R. S. Coffin will continue as vice-president and general manager.

By the acquisition of these companies the Babcock & Wilcox Co. will be able to offer boilers, superheaters, economizers, air heaters, chain grate stokers, oil burners, pulverized fuel equipment, water cooled furnace walls, meters, and combustion control equipment; all in any combination that may be required to supply complete steam generating units.

Monolith Company Secures Land for Term of 100 Years

Involving payment of a minimum of $4,520,000 in royalties during the terms of a lease for 100 years upon Tehachapi lime and clay deposits, the I. M. Jameson corporation has given the Monolith Portland Cement Co. the exclusive right to quarry lime, rock and clay and other materials to be used in cement manufacturing from land near Bakersfield, California. The agreement was filed for record in October, the *Fresno Republican* states.

Under the terms the cement company is to pay a royalty of 5 cents a barrel on cement manufactured, but the minimum royalties in any one month shall not be less than $3,750.

The Jameson interests also acquired title to the holdings of the cement company in the area lying south of the Southern Pacific right-of-way in Kern County.

The deal is one of the largest in mining properties made in Kern County in a number of years.

Men and Mills

Notes from the Field

The Beaver Portland Cement plant at Gold Hill was to be shut down about December 20 for repairs and improvements to remain closed for about a month. Extensive improvements are contemplated. These consist of changes in the finish cement grinding department and to lesser extent in other parts of the plant. The capacity will be increased by the changes.

At the quarry, improvements are to be made looking toward an increase in efficiency of operation. The plant will re-open about February 1.

This is the seventh year of operation of this industry under the present management. The output of the plant for the past four years was about 200,000 barrels annually.

A stock offering was recently made by a syndicate composed entirely of local investment houses and consists of 100,000 shares of Superior Portland Cement, Inc. It is class A participating stock of no par value, paying dividends at the rate of 27½ cents per month and offered at $45 a share.

The corporation is in process of formation to take over all properties and business of the Superior Portland Cement Co. This company began business in 1907 with a capital of $600,000. In 1919, $1,000,000 of 6% bonds were issued to complete payment for properties of the Washington Portland Cement company. The bonds were all paid more than a year ago.

The company the past year had net sales amounting to $3,144,366 and supplied approximately 56% of all cement shipped in the state of Washington. Net earnings have risen steadily until last year they were $909,986 and this year are placed at $1,082,611. Assets of the company are said to aggregate $6,975,080.

The Signal Mountain Portland Cement Co. which has been active for four years or more is making large improvements in 1926, in electrical equipment, the Tennessee Electric Power Co. furnishing power to this and other large industrials in that region.

The Interstate Commerce Commission has docketed for hearing on January 15, before Examiner Weems, a formal complaint filed by the Birmingham Traffic Association in behalf of the Dolcito Quarry Co., at Dolcito, Alabama.

This complaint involves the rates on ground limestone from Dolcito to all points in the southern territory, it being alleged that the present rates are unreasonable and not properly aligned with the rates from Delcito's points of competition, such as Mascot, Tenn.; Eparta, Tenn.; Ladds, Ga., and Cartersville, Ga.

Due to the October and November inclement weather for building construction, which caused an unreasonable slackening in the demand for portland cement and early filling of warehouses, the International Cement Corporation announced that production operation would cease in the early part of December at both its subsidiaries, The Kansas Portland Cement Co. with a mill near Bonner Springs, Kansas, and the Indiana Portland Cement Co. with a mill at Limedale, Indiana.

The stone resources of the upper White river country in Arkansas are being slowly developed. The latest move has been made by the Missouri-Portland Cement Co., which has taken an option on a tract near Earnhart, with a view to putting a cement plant in at that place, according to a report from Cushman.

Members of the Youngstown Builders' Exchange were the guests of the Bessemer Limestone and Cement Co. recently for an inspection of the plant. At the close of the inspection, the builders were served a lunch. This is one of a series of such trips by the builders, who visit many different plants with the purpose of familiarizing themselves with the great variety of products manufactured in and about Youngstown.

The Secretary of State of Delaware has granted a charter to the Phoenix Portland Cement Corporation, Wilmington, $2,500,000.

The opening of a Los Angeles branch at 363 New High Street is announced by the Brown Instrument Company, whose main offices are at Philadelphia, Pa. Mr. S. F. Godfrey, formerly of the Braun Corporation, is in charge as District Manager. Western users of Brown instruments will find convenience in the complete repair department maintained.

R. J. Morse, vice-president and general manager; Paul Van Zant, chief engineer; and J. E. Griffith, superintendent of construction for the Ideal Cement Co., recently met with M. S. Engleman, vice-president of the Central Boarding and Supply Co., of Kansas City, at Fort Collins, Colo., and together they discussed the building of houses for the workmen to be employed in the new $2,000,000 cement mill. There will be a regular little city where now it is but a roving prairie.

B. L. Glover, traffic manager of the Iola Cement Mills Traffic Association, testified recently before a joint hearing at Kansas City, Mo., on cement rates that the freight charges on cement from the Kansas gas belt were too high, compared with the rate charges on other commodities, and that the switching charges on cement in Kansas City were excessive.

The hearing is before John T. Money of Washington, an examiner for the interstate commerce commission; J. L. Brown, chairman of the Missouri public service commission; and Jesse W. Greenleaf, a member of the Kansas public service commission. The complaint was brought by Mr. Glover's organization.

Defendants in the hearing are the Santa Fe and Union Pacific railroads and the Kansas City Terminal Railway Company.

Albert Lee, about 35 years old, employed by the Turner Construction Co., which is engaged on a big contract at the Acme Cement Plant, in Catskill, N. Y., was seriously injured recently, when a large conveyor fell and struck him.

The Massachusetts Supreme Court ruled on October 30, that the decision of the United States Supreme Court in the Alpha Portland Cement Co. case, holding unconstitutional the provision of the Massachusetts law as applied to corporations doing only an interstate business in the state, did not render the entire law unconstitutional. The court pointed out that the question as to whether the law was wholly unconstitutional, because not constitutionally applicable to foreign corporations engaged here exclusively in interstate commerce, was presented for the first time in the Sloane case. The whole statute, it added, "does not fall because it is not applicable" to such corporations.

"It is to be presumed," the court said, "that the legislature intended the section to be applicable only to foreign corporations engaged in extra state commerce and this subject, within constitutional bounds, to the taxing jurisdiction of the commonwealth."

The addition to the plant of the U. S. Gypsum Co., at Gypsum, Ohio, was completed last August. It consists of a permanent fireproof building, 36 ft. by 144 ft. in dimension, its floor and foundations of portland cement concrete, its frame of steel, its walls of Structolite (gypsum) concrete and its roof of Sheetrock-Pyrofill (monolithic gypsum) construction.

The best modern industrial practices in lighting, heating and ventilating have been incorporated, and the latest improved crushing, grinding, screening, mixing and packing machinery has been installed. This plant will manufacture four of the company's specialties—patching plaster, Sheetrock Finisher, a colored stucco-finish and a plastic paint for interior decoration which gives both texture and tone.

Previous to this, the stucco has been manufactured only at Staten Island and the paint, at Fort Dodge, Ia. The new plant is necessary to afford more economical distribution of these commodities and to meet the requirements of the fact that the specialties are assuming increased importance in the company's business. At the same time the plant-laboratory is being enlarged and its personnel is being increased so as to give scientific control to the manufacture of every ton of the specialties, in which uniform color and quality are essential.

The death of Wellington Barnes, a stockholder of the Dixie Portland Cement Co., holding the largest number of shares of any individual, was announced in the December issue of *Dixie Doings*, the house publication of the Dixie company. Mr. Barnes was 83 years old at his death, and had been a stockholder in the Dixie company since its beginning.

Among the cement companies to which the American Blower Co., Detroit, Mich., recently reported having furnished Venturafin heaters are the Southwestern Portland Cement Co., Osborn, Ohio; Fischer Lime & Cement Co., Memphis, Tenn.; the Whitehall Cement Mfg. Co., Cementon, Pa., and the Lehigh Portland Cement Co. at West Coplay and Ormrod, Pa.

Progress in the plans for a two-unit cement plant to be located at St. Stephens, Ala., on the Tombigbee river and a shipping unit at Mobile, Ala., was recently reported from Mobile. The announcement is attributed to Charles L. Hall of the Hermitage Portland Cement Co., Nashville, Tenn. From Mobile it is planned to ship the cement to New Orleans and Tampa for reshipment into the territory to be served. The cost of the plant is estimated at $3,500,000.

The merger of the Dexter Portland Cement Co. of Pennsylvania and the Penn-Allen Portland Cement Co. was announced in the East on December 16 last, when it was stated that the Dexter company had acquired the Penn-Allen company, giving the enlarged company an annual capacity of 2,350,000 bbls. of cement.

E. E. Hartley, sales manager of the state cement plant at Rapid City, S. D., has notified Governor Gunderson that orders for 100,000 barrels of cement to be delivered in 1926 already have been consummated. This, it is stated, represents one-third of the total business done in 1925.

An announcement has been made by the Oxweld Acetylene Co., 30 East 42nd Street, New York City, of the appointment of J. N. Walker as general sales manager. L. D. Burnett has been appointed Eastern department sales manager, to succeed Mr. Walker, and Z. T. Davis, Jr., is now filling Mr. Burnett's former assignment as assistant sales manager, Eastern department. Mr. Walker is well known in the oxy-acetylene industry, having served for many years in progressive advancement through the Oxweld sales organization.

George Weigart of Limedale, Ark., has recently organized a new lime company in Tennessee, which has taken over five of the largest plants in that state. The new concern is known as the Southland Lime Co., and has its general offices in Nashville, according to a report from Limedale.

Development of the vast limestone deposits in the northwestern section of Independence County, Arkansas, and establishment of the largest cement plant in the South, has been practically assured for this year. The Missouri Portland Cement Co. of St. Louis, through the Batesville Cement Co., has obtained leases on more than 1,000 acres of rich limestone deposits near Batesville and between Danieville and Earnheart on the Missouri Pacific Railroad.

The company has opened offices in the First National Bank Building in Batesville and employed engineers who are making tests to decide the extent of the clay shale on their holdings. The tests so far are satisfactory. Construction work is expected to start soon upon a large scale. Details of the cement plant are unknown in Batesville, but local officials of the company say tentative plans of the company call for the expenditure of more than $1,000,000 in foreign capital.

L. G. Black, president of the Missouri Portland Cement Co., and associates recently visited Batesville with L. W. Baldwin, president of the Missouri Pacific Railroad, and John R. Fordyce of St. Louis and investigated this property. President Baldwin made plans for additional railroad trackage and spur tracks to take care of the future development of the project.

Word was received at the offices of the Hawkeye Portland Cement Co. in the Hubbell Building, Des Moines, Iowa, of the death on Sunday of E. L. Colman of LaCrosse, Wis., a director in the company. He was 60 years old. On December 22, L. C. Colman, 72 years old, president of the company, died. They were brothers. A new president will be elected at the annual meeting on February 24.

J. E. Zahn of the United States Portland Cement Co., Denver, is a member of the transportation committee of the Denver Chamber of Commerce. This committee is composed of representative big business men and they are watching Congress and the freight rate questions and will insist upon fair play.

The annual general and professional meeting of the Engineering Institute of Canada was held at the King Edward Hotel, Toronto, on January 27, 28, 29. The registration of approximately 700 included many prominent engineers of Eastern and Western Canada and United States. In addition to the Toronto branch executive, of which Major T. R. Loudon is the chairman, the program and arrangements were in the hands of a special committee headed by Prof. C. R. Young as chairman.

Trade Publications

The Cecil R. Lambert Company of Detroit has just issued a very interesting brochure on Conveyor Applications. This book is of interest to every executive who wishes to lower his material handling costs. Copies may be secured by writing Cecil R. Lambert Company, 3454 Denton St., Detroit, Mich.

Centrifugal Pumps. An up-to-date discussion of the design and applications of centrifugal pumps is presented in this illustrated 72-page book issued by the De Laval Steam Turbine Company, of Trenton, N. J. This company manufactures centrifugal pumps of the single-stage and multi-stage types for power plant, water works, drainage, hydraulic pressure and other services and first introduced in 1901, the high efficiency, high head, high speed centrifugal pump in practically the present form as adopted by most builders of centrifugal pumps, with two part casing split in the plane of the shaft axis.

At the same time the practice of manufacturing centrifugal pumps to limit gages on an interchangeable basis throughout was instituted, so that renewal parts supplied by the factory could be inserted by the customer without having been fitted. Centrifugal pumps are now built to have efficiencies exceeding 87 per cent, and with characteristics such that the load on the driving motor decreases rather than increases when a given discharge is exceeded, thus protecting the motor again overload. Combined with geared steam turbines, centrifugal pumps for water works service compete in duty with the most highly developed triple expansion reciprocating pumping engines. Engineers who have to do with the pumping of water, whether against low or high heads or in small or large quantities should find much of interest in this publication.

"Letting Dynamite Do It." A one-reel motion picture thus entitled has just been made by the Explosives Department of E. I. du Pont de Nemours & Company and can be had for distribution on application to the company. The scenes show the use of explosives in many lines of industry and under many conditions. Practically every part of the country has been combed for pictures showing the employment of dynamite, all of which are picturesque and many sensational. There are views of the use of dynamite in the lumber camps of the Pacific Northwest, where the explosive is used to cut off the tops of tall trees and break log jams; also scenes on the Mexican border where a small mountain is converted into railroad ballast through the employment of thousands of pounds of dynamite. Other scenes show how reefs were blasted away in a Florida harbor, building a swimming pool in the East, taking out concrete foundations in the midst of a great plant without so much as breaking a window, and demolishing in a few minutes a disused blast furnace many feet in height. There are also scenes of the use of explosives in building roads in the West, the unusual application of dynamite in chipping out figures on Stone Mountain where the great Confederate Memorial is being built, and then the spectacular feat of completely demolishing an old stone intake in Lake Michigan at Chicago which was a menace to navigation. This one-reel picture is the second volume issued by the du Pont Company showing the use of dynamite in various operations throughout the country.

The new "*Austin Book of Buildings*" just published is the eighth edition of the general catalog describing the work done by the Austin Company of Cleveland. Some of the unusual features in the new Austin Book of Buildings are:

Cost of building trend with a chart showing seven-year period. Multistory-single story building trend chart. Chart showing decentralization in manufacturing and distribution. Table of comparative insurance rates. Chart showing how soil bearing pressure affects building costs. A ten-page technical section covering descriptions, advantages, relative costs of various types of floors, doors, walls, roof structures, wall facings and roof waterproofings.

All of this special data is included in the new Austin book, in addition to a large number of illustrations and descriptions of modern industrial and commercial buildings. Multistory reinforced concrete and mill type buildings, as well as single story steel frame structures, are included—with examples selected from Austin operations extending from coast to coast.

Austin standard buildings, multistory and single story are illustrated and described in the new book—an entire section being devoted to these well known structures of the permanent type.

Personal copies of the new 100-page Book of Buildings will be mailed to executives upon request. Write the Austin Company, at 16112 Euclid Avenue, Cleveland, Ohio.